

Workshop on fertilization of cocoa
BANGKOK, THAILAND

Mineral fertilization of cocoa in Cote d'Ivoire valuable achievements and research needs

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PLAN:

introduction

valuable achievements

Conclusion and Future Research

Introduction

Context :



Extensive and mobile cocoa system :

- *Plant material not selected*
- *Ineffective cocoa technique*
- *No control of parasites*

Consequence :

- *Low performance of the cocoa system*
- *Yield per hectare very low (less than 350 kg / ha)*

Introduction

Context

Role of research: improve cocoa system



- Selection of improved planting material
- Development of appropriate crop management.



research developed innovative fertilization techniques .

- These techniques allow to externalize production potential of improved planting material (2 to 3 t / ha).

Introduction

Context

Problem: low adoption of fertilizer recommendations



- Insufficient knowledge of fertilization techniques

- Gap extension innovations

However, the extension of such techniques would :

- appropriation by cocoa producers
- improved productivity of cocoa trees
- identification of current expectations of producers and to tailor recommendations.

Introduction

Objectives :

- To summarize the main scientific and technical achievements extension of cocoa mineral fertilization in Côte d'Ivoire.



Valuable achievements

I. Fertilization by Soil Diagnostic

Principe

Ajouter une analyse de sol à la base de donnée

Pays: Ghana

Titre de la parcelle:

Argile + limon (%):

Carbone (%):

Azote (%):

P total (ppm):

P assimil. (ppm):

K (meq%):

Ca (meq%):

Mg (meq%):

Al (meq%):

CEC (meq%):

pH (H₂O):

Méthode d'analyse du P assimilable: Truog-Br2

Enregistrer et Continuer Enregistrer et Sortir Annuler

Soil analysis

N	0.1
P	10
K	0.15
Ca	1.20
Mg	0.80
CEC	15.0
pH	5.10



Fertilizer
N, P, K, Ca, Mg

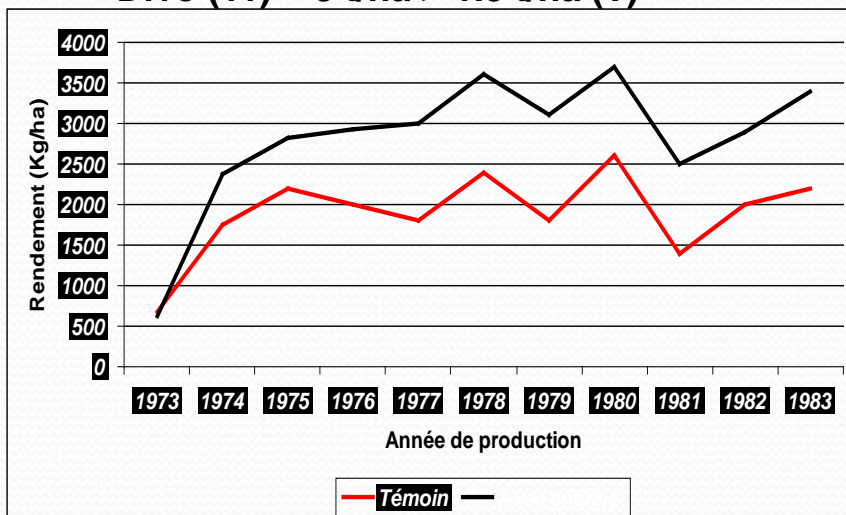
Cocoa needs

N	>0.2%
P	100 ppm
K	8%
Ca	68%
Mg	24%
CEC	15-35
pH	5 – 6

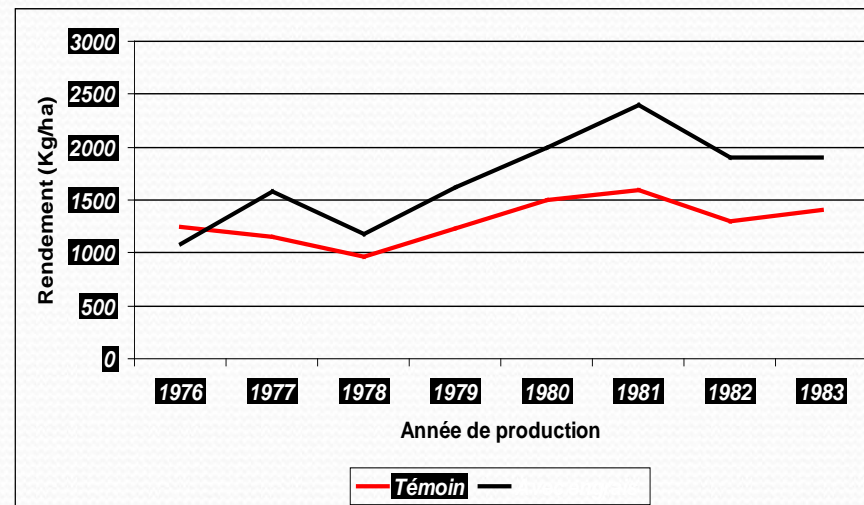
I. Fertilization by Soil Diagnostic

II. Expérimentation

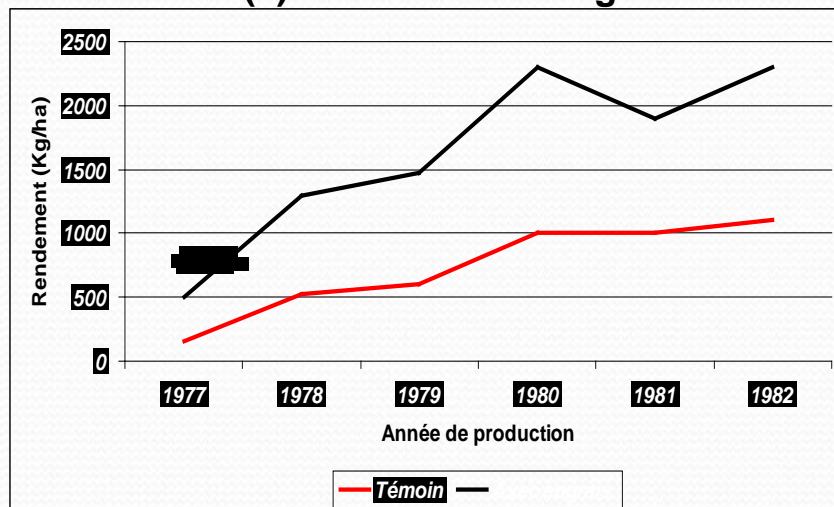
Divo (11) = 3 t/ha > 1.9 t/ha (T)



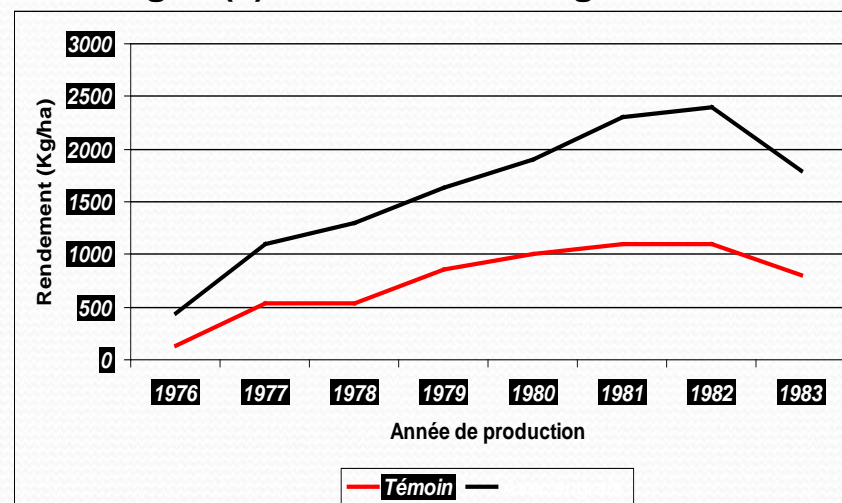
Abengourou (8) = 1.6 t/ha > 1.2 t/ha (T)



Soubré (6) = 1.6 t/ha > 732 kg/ha



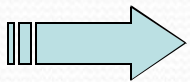
Zagné (8) = 1.6 t/ha > 757 kg/ha



I. Fertilization by Soil Diagnostis

Conditions of Valuable

- Requires physical and chemical analysis of soils: inaccessible for small producers.
- Using the software "Soil Diagnosis " requires knowledge of statistics and computer science.
- Application of the method on-farm: it requires a soil test through planting and probably a fertilizer composition(doses and formulas) different from one farm to another.



Search for regional formulas and doses based on "Diagnosis Soil" trials

II. Fertilization by regional formulas and doses

Expérimentation and result

Zagné (West)

200 g TST
200 g KCl
50 g Kieserite

Divo (Mildle-west)

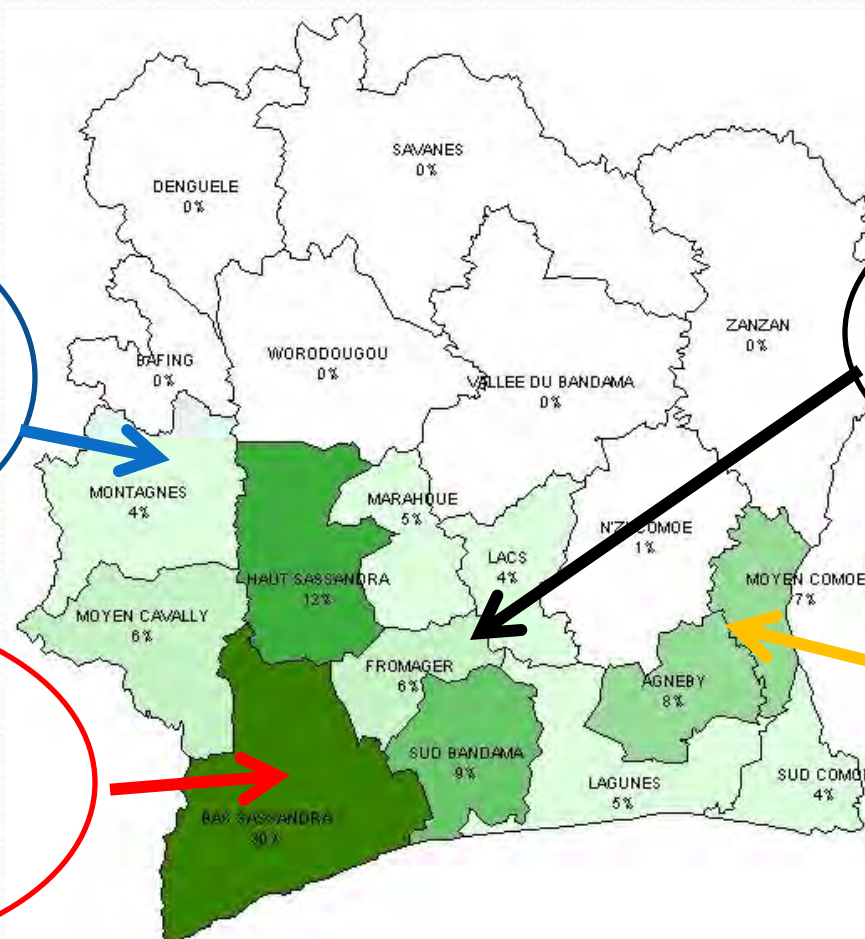
150 g TST
200 g KCl
150 g Kieserite

Soubré (South-west)

200 g TST
200 g KCl
50 g Chaux
magnésien

Abengourou (East)

150 g TST
200 g KCl
100 g Kieserite



II. Fertilization by regional formulas and doses

Conditions of valuable

- *Complex formulas to combine (TSP, KCl, Kiésérite, Chaux Magnésien)*
- ❖ *The regional formulas have experienced a deficit of extension even if it requires today an update of recommendations.*
- *Faced with these difficulties and taking into account previous experiences, research and its partners have decided to propose a simplified formula.*

III. Fertilisation simplified formula « cocoa fertilizer »

Expérimentation and result :



The formula is : NPK (0-23-19 + 10 CaO + 5 MgO)

With collaboration of Hydrochem (YARA WEST AFRICA)

III. *Fertilisation simplified formula* « cocoa fertilizer »

Conditions of valuable :

- Central West and East 150 g / plant x 2 times
- West and Southwest 200 g / plant x 2 times
- Mineral fertilizer cost-effective only for well-managed plantations (clean, cut and use of pesticides)
- Application in mars-avril and september
- Crow application (0.6 to 1 m for plantation in production)





CONCLUSION

CONCLUSION

- **1) Soil Diagnostis :**
 - Difficult to transfer technology> technical and economic reasons.
- **2) Regional Formula :**
 - Need to update
- **3) Simplified formula :**
 - Technique known by the producers but poorly implemented (dose, frequency and period of application).



Research needs

Research needs

> Update formulas and doses of fertilizer by region, specially with using new fertilizers : NPK 0-23-19 + NITRABOR (15,5 N-26.5 CaO- 0.2 B)



HydroCao+Nitrabore

Research needs

- > Characterize current soil fertility
(soils of old plantations and fallow)
- > Review the chemical equilibria and rates of fertilization
- > To train extension workers and farmers for composting of crop residues (organic fertilizer)



THANK YOU